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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/005,325 | 11/12/2001 | William C. Hurley | C0012 | 9482 |

21495 7590 04/10/2003

CORNING CABLE SYSTEMS LLC
P O BOX 489
HICKORY, NC 28603

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| EXAMINER |
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ARTMAN, THOMAS R

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| ART UNIT | PAPER NUMBER |
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2882

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/005,325

Applicant(s)

HURLEY ET AL.

Examiner

Thomas R Artman

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 1, 10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1 and 10 are objected to because of the following informalities: the manner in which the cable jacket limitation is written, it appears as though the cable jacket surrounds the separation layer, which makes sense. However, the rest of that indentation contradicts that arrangement, saying instead that the cable jacket inhibits the adhesion between itself and the fiber bundles. The examiner realizes that the separation layer separates the jacket from the bundles. Perhaps a phrase like, “a cable jacket surrounding said separation layer, wherein said separation layer inhibits adhesion...” may best reflect the invention.

Appropriate correction is required.

Claim 11 is objected to because of the following informalities: it is a verbatim copy of part of the limitations set forth in the first indentation of its parent claim 10. It is therefore redundant and should be removed.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-7, 10-11 and 23-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferguson (US 5,422,973).

Regarding claim 1, Ferguson discloses the structure in his fiber optic cable, including:

- 1) at least one bundle comprising a plurality of non-tight buffered optical fibers (Fig.4) and a binder element (item 12, see Fig.2 for clarity),
- 2) the binder element maintains the plurality of non-tight buffered optical fibers in said at least one bundle,
- 3) a separation layer (item 19) generally surrounding at least one bundle,
- 4) a cable jacket (item 21) surrounding said separation layer, where the separation layer inhibits adhesion to the cable jacket, and
- 5) it is a "dry" cable, excluding a grease or grease-like composition as a water repellant (col.1, Background...teaches against "wet" structures, no grease-like compound disclosed).

With respect to claim 2, Ferguson further discloses the binder element being a binder yarn or tape (col.1, lines 65-67).

With respect to claim 5, Ferguson's binder element is a binder thread that encircles the plurality of optical fibers.

With respect to claim 6, the separation layer (Figs.3-4, item 19) being one of a fiberglass or aramid yarn (col.2, lines 23-24), a water-swellaable tape (col.2, lines 25-26), and, in another embodiment (Fig.3), Ferguson discloses the use of an armor layer (item 20) as a separation layer.

With respect to claim 7, the separation layer (Fig.4, item 19) has a tensile strength characteristic.

Regarding claims 10 and 11, Ferguson discloses the structure (Fig.4), including:

- 1) at least one bundle (item 10) comprising a plurality of non-tight buffered optical fibers and at least one binder thread (item 12) encircling the plurality of optical fibers to thereby maintain the plurality of optical fibers in the bundle (see Fig.1 for clarity, and col.1, lines 65-67),
- 2) a separation layer surrounding at least one bundle (item 19),
- 3) a cable jacket (item 21) surrounding the separation layer, where the separation layer inhibits adhesion between the bundle of fibers and the cable jacket, and
- 4) excluding a grease or grease-like material for filling the gaps in order to block water infiltration.

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Regarding claim 23, Ferguson has the structure, including:

- 1) at least one bundle comprising a plurality of optical fibers (Fig.3, item 10) and a binder element (item 12),
- 2) the binder element maintains the plurality of fibers in at least one bundle,
- 3) an armor layer surrounding at least one bundle (item 20), and
- 4) excluding a cable jacket within the armor layer.

With respect to claim 24, Ferguson's plurality of optical fibers being non-tight buffered (Fig.3).

With respect to claim 25, Ferguson further discloses the binder element being a binder yarn or tape (col.1, lines 65-67).

With respect to claim 26, Ferguson's binder element is a binder thread that encircles the plurality of optical fibers.

With respect to claim 27, Ferguson's cable also has a cable jacket (item 21) generally surrounding the armor layer.

Claims 1, 9-11, and 15-18 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Blew (US 5,345,526).

Regarding claim 1, Blew discloses the structure in a fiber optic cable (Fig.1):

- 1) at least one bundle (item 24) comprising a plurality of non-tight buffered optical fibers,
- 2) a binder element (item 26) maintaining the plurality of non-tight buffered optical fibers in at least one bundle (col.5, lines 10-20),
- 3) a separation layer (item 18) generally surrounding the bundle,
- 4) a cable jacket (item 20) surrounding the separation layer, where the separation layer prevents adhesion between the cable jacket and bundle, and
- 5) excluding a grease or grease-like composition interstitially placed for water inhibition.

With respect to claim 9, Blew's cable is part of a break out cable (col.2, lines 3-22).

Regarding claims 10 and 11, Blew discloses the structure (Fig.1), including:

- 1) at least one bundle (item 24) comprising a plurality of non-tight buffered optical fibers and at least one binder thread (item 26) encircling the plurality of optical fibers to thereby maintain the plurality of optical fibers in the bundle (col.5, lines 10-20),
- 2) a separation layer surrounding at least one bundle (item 18),
- 3) a cable jacket (item 20) surrounding the separation layer, where the separation layer inhibits adhesion between the bundle of fibers and the cable jacket, and
- 4) excluding a grease or grease-like material for filling the gaps in order to block water infiltration.

With respect to claim 15, Blew's cable is part of a break out cable (col.2, lines 3-22).

Regarding claim 16, Blew discloses a fiber optic cable with the following structure:

- 1) a central member (Fig.1, item 12),
- 2) at least one bundle (item 24) of a plurality of non-tight buffered optical fibers (item 22),
- 3) a binder element (item 26) holding the non-tight optical fibers in the bundle (col.5, lines 10-20),
- 4) a cable jacket surrounding the bundle (item 20),
- 5) a separation layer for inhibiting adhesion between the bundle and cable jacket (item 18), and
- 6) the cable excludes a grease or grease-like composition for interstitial blocking of water.

With respect to claims 17-18, Blew discloses the use of thread as a binder element that encircles the plurality of non-tight buffered optical fibers.

With respect to claim 22, Blew discloses the use of aramid yard as the separation layer (col.4, line 55).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blew.

Regarding claim 3, Blew does not specifically disclose a fiber optic cable that has a diameter of approximately 10mm. However, Blew discloses an optical fiber cable structure (Fig.3) having the capability of having 144 (and as much as 288) optical fibers in non-tight buffered bundles (col.5, lines 48-60), while maintaining acceptable diameters, which are much less than 19mm, as described in col.7, lines 10-18 and lines 47-56. Blew stresses the need for smaller cables, stating that "large" conventional cables are over 19mm in diameter and only carry 96 optical fibers, and "unacceptably" large cables are those that have diameters larger than about 26mm and carry only the same amount.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a fiber optic cable carrying a large number of fibers, such as 144, while keeping the diameter within reasonable limits. Given Blew's teachings and compact structure, it is reasonable that Blew's cable falls within the proposed reasonable limits, which include diameters much less than 19mm, within which "about 10mm or less" falls.

With respect to claim 4, the same teaching applies as stated above against claim 3, where Blew's cable design diameter falls within the range of less than 20mm, teaching that "large" cables have diameters around 19mm.

Blew does not disclose the use of an additional tight-buffered layer. He does teach that an additional layer of fiber bundles can be added without appreciably increasing the diameter of the overall cable. Further, one skilled in the art would appreciate that the use of tight-buffered optical fibers would minimize the diameter increase even more.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an additional layer of bundles in order to increase the capacity of the cable while minimally increasing the overall cable diameter.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson and in view of Blew.

Ferguson does not teach the use of a central strength member. Blew discloses the use of a central strength member (Fig.1). Having a strength member in the center allows for greater optical fiber packing densities housed in multiple buffer tubes as well as improved access to small groups of cables in a drop cable application (col.2, lines 3-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a central strength member in order to provide arrangements with greater packing densities while improving access to individual groups of fibers.

Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson and in view of Uhlenhuth (DE 195 46 773 A1).

Regarding both claims, Ferguson does not disclose a binding element that uses looper threads and needle threads that are secured by overlapped stitches.

Uhlenhuth discloses, at least in Figs. 14-15, the use of a loop thread and needle thread that cooperate to encircle a bundle of electrical or optical conductors, where the two threads are interlocked by the needle thread passing through loops in the loop thread in a substantially "overlapped" manner. In this way, a secure binding of the conductor bundles can be maintained while being more efficient in manufacturing and cost (Background and beginning of Summary).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a loop thread and needle thread in an overlapped stitch pattern for an efficient method of securing fiber bundles.

Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blew and in view of Uhlenhuth.

Regarding both claims, Blew does not disclose a binding element that uses looper threads and needle threads that are secured by overlapped stitches.

Uhlenhuth discloses, at least in Figs. 14-15, the use of a loop thread and needle thread that cooperate to encircle a bundle of electrical or optical conductors, where the two threads are interlocked by the needle thread passing through loops in the loop thread in a substantially "overlapped" manner. In this way, a secure binding of the conductor bundles can be maintained while being more efficient in manufacturing and cost (Background and beginning of Summary).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a loop thread and needle thread in an overlocked stitch pattern for an efficient method of securing fiber bundles.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson and in view of Lochkovic (US 5,561,730).

Though Ferguson does not teach the use of silicone based coatings, Lochkovic discloses the use of silicone layers as a friction reduction technique in fiber optic cables. This minimizes the damage of the fibers due to wear from excessive relative motion that occurs during installation and over a lifetime of service.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the binding threads with a silicone finish such that the longevity of the fibers would be improved by adding such a friction reducing coating to the binder threads. In this way, wear between the fibers in the bundles and the surrounding loose buffer tube is mitigated.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blew and in view of Lochkovic.

Though Ferguson does not teach the use of silicone based coatings, Lochkovic discloses the use of silicone layers as a friction reduction technique in fiber optic cables. This minimizes the damage of the fibers due to wear from excessive relative motion that occurs during installation and over a lifetime of service.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the binding threads with a silicone finish such that the longevity of the fibers would be improved by adding such a friction reducing coating to the binder threads. In this way, wear between the fibers in the bundles and the surrounding loose buffer tube is mitigated.


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Goldmann (US 4,684,214) and White (US 4,682,850) both disclose the use of silicone-based coatings for reducing friction and cushioning components of an optical fiber cable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TRA 
March 24, 2003

DAVID V. BRUCE
PRIMARY EXAMINER